

REMARKS**Claim Status**

Claims 1-24 and 26-29 are pending in the application. This paper amends claims 1, 5, 6, 11, 12, 17-21, 23, 24, and 29. Claims 1, 5, 6, 11, 12, 17, 18, 23, and 24 are the independent claims of the instant application.

Finality of Action and Entry of Amendment

A second or subsequent Office action “on the merits shall be final, except where the examiner introduces a new ground of rejection that is neither necessitated by applicant’s amendment of the claims nor based on information submitted in an information disclosure statement filed during the period set forth in 37 CFR 1.97(c) with the fee set forth in 37 CFR 1.17(p).” MPEP § 706.07(a). In the present case, the Final Office Action introduces a new ground of rejection of claims 1-11, 17-22, 24, and 26-29. The new ground of rejection, which is based on 35 U.S.C. § 101, was not necessitated by amendment of the claims. The new rejection is also not based on an information disclosure statement (IDS) submitted as described in MPEP § 706.07(a), because no such IDS has been submitted and the rejection is not art-based. Therefore, finality of the Office Action is premature and should be withdrawn. *See* MPEP § 706.07(d). We respectfully request the Examiner to take such action and enter the above amendment.

Section 101 Rejections

Claims 1-11

The Final Office Action rejected claims 1-11 under 35 U.S.C. § 101 as directed to non-statutory subject matter. In particular, the Final Office Action applied the section 101 rejections because “it is uncertain what performs each of the claimed method steps. Moreover, each of the claimed steps, inter alia, selecting, prohibiting, changing, running, altering, providing, can be practiced mentally in conjunctions with pen and paper.” The Final Office Action suggests the preambles of these claims be amended to recite a “computer implemented method,” rather than simply a “method.” To advance prosecution of the present application, Applicants have amended independent claim 1 by adopting the express suggestion of the Final Office Action. Thus, section 101 rejections of claim 1 and claims 2-4, which depend from claim 1, should be overcome by the amendment. With respect to claims 5-11, Applicants respectfully traverse the rejection.

Whether the steps of the methods can be performed mentally or using pencil and paper is not determinative of the claims’ status as patentable subject matter. “The inclusion in a patent of a process that may be performed by a person, but that also is capable of being performed by a machine, is not fatal to patentability.” *Alco Standard Corp. v. Tennessee Valley Authority*, 808 F.2d 1490, 1 U.S.P.Q.2d 1337 (Fed. Cir. 1986), *cert. dismissed*, 483 U.S. 1052 (1987). As the Board of Patent Appeals and Interferences has noted, “[i]t is not important whether the claims contain mental steps or not if the process is within the technological or useful arts.” *Ex parte Nassim*, Appeal No. 91-2486, slip opinion at 5 (BPAI 1991) (unpublished).¹

Claims 17-22, 24, and 26-29

The Final Office Action rejected claims 17-22, 24, and 26-29 under 35 U.S.C. § 101 as directed to non-statutory subject matter. According to the Final Office Action, these claims are “not tangibly embodied in a manner so as to be executable and the system itself is not including any hardware, thus lacking utility.” Although the Applicants do not subscribe to this characterization of the claims in issue, independent claim 17 has been amended to recite a plurality of processors and a memory accessible to each processor of the plurality of processors, the memory storing a program code base. Independent claim 18 and claims 19-22, which depend from claim 18, have been likewise been amended to recite a plurality of processors and a memory accessible to each processor of the plurality of processors, the memory storing code. Thus, the section 101 rejection of these claims should be overcome by the amendment.

With respect to claims 24 and 26-29, Applicants respectfully traverse the rejections. Each of the claims 24 and 26-29 recites memory or mass storage in the claim’s respective preamble. It is well established that such claims are directed to patentable subject matter. *E.g., In re Beauregard*, 53 F.35 1583, 35 U.S.P.Q.2d 1383 (Fed. Cir. 1995). Both memory and mass storage devices are “tangible.”

Furthermore, deficiencies under the “useful invention” prong of section 101 arise in one of two forms: (1) when the applicants fail to identify any specific and substantial utility or disclose sufficient information to make the invention’s usefulness immediately apparent to persons familiar with the pertinent technological field, and (2) where assertion of specific and substantial utility is not credible. MPEP § 2107.01. In this case, the specification amply demonstrates useful functions

¹ Applicants refer to this unpublished and therefore non-precedential opinion solely to point the Examiner to a source of rationale debunking the “mental step” doctrine.

performed by the invention. Thus, there is no deficiency under the first prong of the test. If the rejections are based on the second prong of the test, then some evidentiary basis supporting lack of credibility of the assertion of utility should have been given in the Final Office Action. No evidentiary basis in support of lack of utility contention has been offered, and therefore the claims should not be rejected for lack of utility.

Art Rejections

Rejection of Claims 1-9, 11-15, 17-21, and 23-28 as Being Anticipated By Frank

Claims 1-9, 11-15, 17-21, and 23-28 were rejected under 35 U.S.C. §102(b) as being anticipated by Frank *et al.*, U.S. Patent Number 5,790,851 (“Frank” hereinafter).

The Final Office Action states that Frank discloses each task being associated with one of a plurality of scheduling domains, and the step of prohibiting more than one task associated with the same scheduling domain from running concurrently. Specifically, the Final Office Action points to Frank, column 6, lines 4-29, 44-48, and 57-62; column 8, lines 15-29 and 43-67; column 9, lines 1-11; and Figures 2B, 2C, 5, 6A, and 6B, as disclosing these limitations. Applicants have previously argued that Frank does not contain such disclosure.

Responding to the Applicants’ arguments, the Final Office Action states that “[w]ith respect to the concept of the scheduling domain, the examiner interprets it as a shared resource that can be scheduled to have only one task/process to access/execute at any given time. . . . Frank clearly

discloses or suggests the limitation because there is only one process/task is allowed to access the shared resource at any given time.”

Initially, Applicants note that whether Frank *suggests* the limitation is of no consequence to the rejections for anticipation under section 102. If a single prior art reference, such as Frank here, does not expressly or inherently disclose all of the limitations in a claim, the claim is not anticipated by the reference, regardless of what is “suggested.” Thus, the section 102 rejections are improper if Frank merely *suggests* but does not disclose the limitation.

Second, the Final Office Action misconstrues the limitation in question and the invention. The issue is not whether Frank discloses a system where only one process/task is allowed to access the shared resource at any given time. The issue (or rather one of the issues) with respect to claim 1 and other independent claims is whether Frank discloses (a) associating tasks with a plurality of scheduling domains so that (b) multiple tasks can run concurrently in different scheduling domains, while prohibiting more than one task from running concurrently in the same scheduling domain. Frank apparently does not disclose or suggest these limitations.

Instead, Frank expressly teaches the use of locks for synchronizing access to shared resources, rather than the use of scheduling domains. For example, Frank discloses that “[a]ny of the shared resources 102a, 104a, and 109 can be accessed by any processor of processors 101(1)-101(8) after its associated access request is synchronized by obtaining a lock.” Frank, col. 6, lines 11-14 (emphasis added). Frank does not teach the use of scheduling domains whereby only one task associated with a particular scheduling domain can run at a time, while multiple tasks can run concurrently in different domains, as is recited in amended claim 1. In contrast, prohibiting more

than one process from running in the same domain allows elimination of locks (or of other explicit synchronization techniques for accessing a shared resource) with respect to the tasks in the same domain. If only one task from a domain may run at a time, then there is no contention for shared resources among tasks within the domain, and no need to synchronize access to the shared resource among the tasks of the domain.

For enhanced clarity, claim 1 has now been amended to recite expressly the step of allowing a plurality of tasks of the set of tasks to run concurrently in different scheduling domains. Applicants believe that the limitation of allowing multiple tasks to run in different domains was implicit in claim 1 as it stood previously. For example, the definition of “scheduling domain” states that “[m]ultiple tasks from different scheduling domains can run concurrently.” Specification; at page 11.

Claim 1 also has been amended to recite that “tasks within each scheduling domain can be run on different processors but are prohibited from running concurrently.” This new claim language is directed specifically to how the tasks are scheduled to run on the plurality of processors. In this regard, Frank states that “[a] scheduler within the operating system, which is one of the executed processes, determines which processor will execute which process and when *in accordance with well known techniques*.” Frank, col. 6, lines 22 to 25 (emphasis added). Frank does not appear to Applicants to include any further discussion of these “well known techniques.” Frank certainly does not discuss the new limitation embodied by this claim language. Accordingly, for this additional reason, claim 1 is believed to be allowable over Frank.

Independent claims 6, 12, 18, and 24 have been similarly amended for the same reason as claim 1, and recite similar or identical limitations as those discussed above in relation to claim 1.

At least for the reasons discussed above, Applicants respectfully submit that Frank does not anticipate claims 1, 6, 12, 18, and 24.

Independent claims 5, 11, 17, and 23, as amended, recite implicit synchronization and concurrent execution/running of multiple tasks (or similarly worded limitations). “Implicit synchronization” is defined and described in detail in the specification of the instant application. For example, the specification teaches that “[t]he invention provides implicit synchronization, in which resources are synchronized by operation of the scheduling domain restrictions described herein.” Specification, at page 11, lines 13-15. Operation of scheduling domains is also defined in the specification:

- scheduling domain — in general, a set of tasks and resources selected by designers or program coders for operation in a multiprocessor system, where it’s understood that only one task in the set is allowed to run and access the resources at any given time. Multiple tasks from different scheduling domains can run concurrently.

Specification, at page 10, line 20, through page 11, line 2. The specification further contrasts implicit synchronization of the invention with explicit synchronization:

With explicit synchronization, a first task 121 and a second task 121 each attempt to access a shared resource 122, such as a data structure. To prevent improper concurrent access to the shared resource 122, each task 121 makes explicit calls 601 to a synchronization mechanism 602. The synchronization mechanism 602 might include a lock, a semaphore, a monitor, or other methods known in the art of operating systems.

With implicit synchronization, it is assumed by the application that the scheduler will provide the synchronization, by not running multiple tasks in the same domain concurrently. The first task 121 and the second task 121 each have an associated scheduling domain 123. If the two scheduling domains 123 are different,

that indicates a designer's or program coder's decision that the two tasks 121 will not perform improper concurrent access to the shared resource 122 (in alternative embodiments, different scheduling domains 123 may indicate that if there is any improper concurrent access to the shared resource 122, no harm will come to the system 100). If the two scheduling domains 123 are the same, that indicates a designer's or program coder's decision that the two tasks 121 might perform improper concurrent access to the shared resource 122, thus that the two tasks 121 are not allowed to execute concurrently.

Application, page 21, lines 6-22 (emphasis added). Therefore, the "implicit synchronization" limitations in claims 5, 11, 17, and 24 are similar or identical to prohibiting more than one task from running in the same domain. At the same time, multiple tasks are executed in different domains. As discussed above in relation to claims 1, 6, 12, 18, and 24, Frank apparently does not disclose these limitations.

Further with respect to claims 5, 11, 17, and 23, each of these independent claims has been amended to recite a feature along the lines that tasks within each scheduling domain can be run on different processors but are prohibited from running concurrently. As discussed above with respect to claim 1, Frank does not teach such a feature, but rather discusses that scheduling of processes is performed using "well known techniques."

At least for the reasons discussed above, Applicants respectfully submit that Frank does not anticipate claims 5, 11, 17, and 23.

Rejection of Claims 5 and 23 as Being Anticipated By Rehg

In rejecting claims 5 and 23 as anticipated by Rehg *et al.*, U.S. Patent Application Publication Number 2002/0091748 ("Rehg" hereinafter), the Final Office Action cites numbered paragraphs [0050], [0052], and [0053] of the reference for disclosure of all limitations of these claims.

Applicants have previously argued that although Rehg mentions certain “data access primitives,” Rehg does not describe these primitives, and does not disclose how the primitives achieve synchronization. Applicants have also argued that Rehg does not disclose “implicit synchronization” and “scheduling domains” as these terms are defined in the specification, and that Rehg does not disclose prohibiting more than one process from running concurrently in the same domain. These arguments have not been answered. Instead, the Final Office Action repeats the rejections. Applicants again respectfully request that the claims be construed using the definitions provided by the specification. If the rejections of claims 5 and 23 are repeated, Applicants respectfully request a response to the arguments. See MPEP § 707.07(f). Otherwise, withdrawal of the rejection of claims 5 and 23 over Rehg is respectfully requested.

Furthermore, as mentioned above, claims 5 and 23 have been amended to recite that tasks within each scheduling domain can be run on different processors but are prohibited from running concurrently. Rehg, which is concerned with data parallelism and task parallelism, does not appear to Applicants to discuss such scheduling domains. Thus, withdrawal of the rejection of claims 5 and 23 over Rehg is requested for this reason as well.

The above discussion addresses patentability of all pending independent claims. As regards dependent claims not specifically discussed, these claims are patentable together with their base claims and intervening claims, if any.

CONCLUSION

For the foregoing reasons, Applicants respectfully submit that all pending claims meet the requirements of 35 U.S.C. § 101, and are patentable over the references cited in the Final Office Action. To discuss any matter pertaining to the present application, the Examiner is invited to call the undersigned attorney at (650) 947-0700.

Having made an effort to bring the application in condition for allowance, a timely notice to this effect is earnestly solicited.

SAS
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Respectfully submitted,

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